

## SECTION I.—AEROLOGY.

## SOLAR AND SKY RADIATION MEASURED AT WASHINGTON, D. C., DURING OCTOBER, 1915.

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[Dated: Washington, D. C., November 16, 1915.]

In Table 1 are summarized the measurements of the intensity of direct solar radiation made by the Weather Bureau at the American University,<sup>1</sup> Washington, D. C., during October, 1915. The means for the month are slightly lower than the 5-year means published in the Bulletin of the Mount Weather Observatory, 1912, 5:182, Table 3.

Skylight polarization, measured at solar distance 90° and in his vertical, with the sun at zenith distance 60°, averaged 64 per cent, with a maximum of 70 per cent on the 23d. This latter is 6 per cent higher than the average maximum polarization for October published in the Bulletin of the Mount Weather Observatory, 1910, 3:114, Table 16, and 1 per cent higher than any polarization measurement previously obtained at Washington in October.

TABLE 1.—Solar radiation intensities at Washington, D. C., during October, 1915.

(Gram-calories per minute per square centimeter of normal surface.)

Date.	Sun's zenith distance.										
	0.0°	48.3°	60.0°	66.5°	70.7°	73.6°	75.7°	77.4°	78.7°	79.8°	80.7°
	Air mass.										
	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
A. M.	Gr.-cal.	Gr.-cal.	Gr.-cal.	Gr.-cal.	Gr.-cal.	Gr.-cal.	Gr.-cal.	Gr.-cal.	Gr.-cal.	Gr.-cal.	Gr.-cal.
October 3.....						0.79	0.72				
4.....	1.02	0.88	0.75								
8.....	1.07	0.92	0.81								
9.....	1.30	1.20	1.12	1.05	0.97	0.88	0.82	0.77	0.72	0.66	
10.....	1.32	1.22	1.14	1.06	0.98	0.93	0.87	0.83	0.76	0.72	
11.....	1.31	1.09	1.00	0.97	0.94	0.87	0.81	0.76	0.70	0.65	
12.....	1.33	1.25	1.18	1.11	1.04	0.98	0.91	0.86	0.82	0.79	
23.....	1.38	1.08	0.93	0.74							
25.....	1.15		0.94	0.86	0.75						
26.....	1.14	1.01	0.89	0.79	0.73	0.68	0.63				
28.....	1.09	0.97	0.90		0.70						
30.....				0.84	0.76						
31.....				1.05	1.01	0.98	0.94	0.89	0.84	0.79	
Means.....	1.21	1.07	0.97	0.94	0.87	0.86	0.83	0.82	0.77	0.72	
P. M.	Gr.-cal.	Gr.-cal.	Gr.-cal.	Gr.-cal.	Gr.-cal.	Gr.-cal.	Gr.-cal.	Gr.-cal.	Gr.-cal.	Gr.-cal.	Gr.-cal.
October 4.....	1.22	1.07	0.93	0.84	0.75		0.57				
8.....	1.12	1.23	1.16	1.04	0.91	0.81	0.72				
11.....	1.31	1.17	1.08	1.01		0.87	0.80				
12.....	1.31	1.22	1.13	1.06	0.99	0.92	0.86	0.80			
21.....	1.25	1.11	1.04	0.93	0.84	0.76	0.69	0.63			
23.....	1.26	1.16	1.06	0.98	0.91	0.84	0.78	0.73	0.70		
25.....	1.00	0.89		0.67	0.61	0.57	0.52	0.48			
27.....	1.23	1.15	1.05	0.96	0.88	0.82	0.77	0.72	0.69	0.64	
28.....	0.93	0.80	0.72	0.65	0.61	0.57	0.53	0.49	0.45		
30.....		1.14	0.91	0.85	0.83	0.81	0.79	0.76	0.73		
Means.....	1.24	1.13	1.02	0.94	0.83	0.79	0.72	0.68	0.62	0.60	

In Table 2, column 2 gives the daily totals of solar and sky radiation received on a horizontal surface at the American University during October, 1915. The measurements were made with a Callendar recording pyrheliometer, as described in the REVIEW for March, 1915, 43:100. Table 2, column 3, gives the daily departures from the normals published in the same number of the REVIEW, page 110, Table 4.

The "Percentage of possible sunshine" and the "Average cloudiness," given in columns 5 and 6, Table 2, have been taken from the records of the observatory of the central office of the Weather Bureau. The monthly mean percentage of possible sunshine is 63, or practically the same as the normal for October.

The above data indicate the usual number of hours of sunshine during October, but radiation intensities slightly below the average for the month. The third decade was the only one showing radiation in excess of the normal.

TABLE 2.—Daily totals and departures of solar and sky radiation at Washington, D. C., during October, 1915.

(Gram-calories per square centimeter of horizontal surface.)

Day of month.	Daily totals.	Departure from normal.	Excess or deficiency since first of month.	Percentage of possible sunshine.	Average cloudiness.
	Gr.-cal.	Gr.-cal.	Gr.-cal.	Per cent.	0-10.
October 1.....	61	-275	-275	1	10
2.....	196	-138	-413	17	8
3.....	381	50	-363	100	0
4.....	411	83	-280	100	1
5.....	136	-180	-470	9	9
6.....	199	-124	-604	28	8
7.....	64	-250	-850	0	10
8.....	390	72	-778	93	3
9.....	337	42	-736	75	3
10.....	438	126	-610	100	0
11.....	423	123	-487	100	0
12.....	429	122	-365	100	0
13.....	322	18	-347	54	6
14.....	189	-113	-460	22	9
15.....	294	5	-465	74	6
16.....	34	-262	-737	0	10
17.....	57	-236	-963	0	10
18.....	92	-198	-1,161	0	10
19.....	244	-43	-1,204	44	8
20.....	137	-147	-1,351	4	10
Decade departure.....			-741		
October 21.....	289	8	-1,343	75	3
22.....	339	61	-1,282	97	2
23.....	366	91	-1,191	100	0
24.....	390	118	-1,073	100	0
25.....	335	66	-1,007	100	0
26.....	300	34	-973	92	3
27.....	330	67	-906	88	3
28.....	297	37	-879	109	0
29.....	303	46	-823	13	5
30.....	338	83	-740	100	0
31.....	309	57	-683	100	1
Decade departure.....			668		
Total excess or deficiency since first of year.....			-1,704		

## EFFECTS OF HURRICANES ON THE UPPER AIR CURRENTS.

By Prof. W. H. PICKERING.

[Dated: Mandeville, Jamaica, Nov. 13, 1915.]

It is well known to astronomers that if we point a telescope on a bright star, remove the eyepiece, and place the eye near the focus, we shall perceive a bright disk crossed by dark fluctuating dots or lines due to air currents in our upper atmosphere. The same result is obtained if we draw out the eyepiece a few millimeters beyond the focus. In the latter case if we determine the number of millimeters, we can readily compute the altitude of the current whose motion we are observing. The dark lines travel longitudinally, and the diameter of the objective divided by their number gives us the linear distance between them.

It has been the writer's fortune, good or bad, to be on the island of Jamaica during the passage of four hurricanes in its vicinity. The atmospheric definition, which is of fundamental importance in all astronomical observations, is exceptionally good on this island, as it probably is in most tropical countries as compared with what is found in northern latitudes. In each case, however, a few days before the passage of the hurricane the definition, or "seeing" as it is usually called, dropped to a very marked degree, indeed it became as bad as it usually is in the north. Such bad "seeing" is never experienced here unless a hurricane is in the vicinity. To express the fact numerically, the "seeing" usually fluctuates here

<sup>1</sup> For a description of exposures of instruments and details of methods of observation see this REVIEW, December, 1914, 42:548.